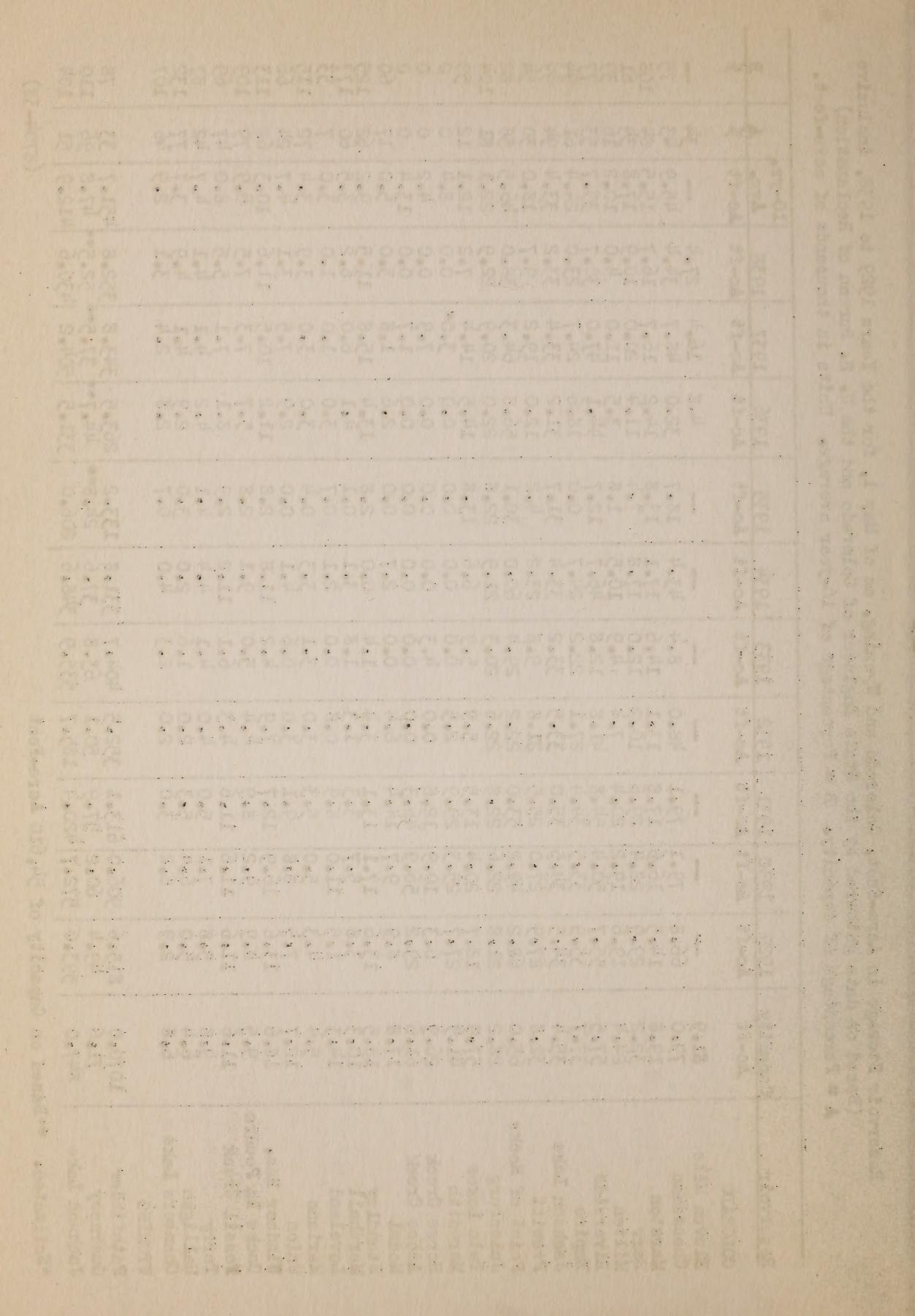


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**SNOW SURVEYS AND IRRIGATION WATER FORECASTS
FOR MISSOURI AND ARKANSAS RIVERS**

March 1, 1939

The following data pertaining to snow surveys and irrigation water-supply forecasts are provided by the Bureau of Agricultural Engineering of the U. S. Department of Agriculture, in cooperation with State departments, other Federal bureaus and local organizations. The snow measurements are made principally by field personnel of the following organizations: Forest Service, National Park Service, Bureau of Reclamation, U. S. Geological Survey, War Department and State Experiment Stations. This work is otherwise conducted cooperatively with the State Engineers of Wyoming and Colorado, and various municipalities, irrigation associations, power companies and others. Precipitation records are supplied by the U. S. Weather Bureau.

PRECIPITATION DATA

WATERSHED	STATE	Precipitation October 1 to February 28	Departure From Normal		Precipitation February Inches	Departure from Normal Inches
			Inches	Inches		
Missouri	East. Mont.	2.91	-0.06		0.30	+0.16
Missouri	Cent. Mont.	4.17	+0.41		0.51	+0.09
Missouri	North Wyo.	7.08	+1.62		0.93	+0.01
North Platte	Wyoming	4.31	-0.33		0.85	+0.01
South Platte	Colorado	3.96	+0.28		0.81	+0.04
Arkansas	Colorado	4.02	+0.72		1.70	+0.80

For the North Platte River drainage in Colorado and Wyoming, 14 snow courses show about 5 percent less water content than for March 1, last year. The depth of snow cover over this drainage is slightly greater than it was a year ago. In the South Platte River drainage in Colorado, 12 snow courses show the average water content to be about 8 percent greater than for March 1, 1938. The average water content for 5 snow courses in the Arkansas River drainage is 36 percent greater than it was for these courses last year at this same time. For 7 snow courses on the Poudre the average water content is 8 percent less than last year, and for the Laramie River the record for 8 snow courses shows the water content to be slightly less than a year ago.

Reservoir storage in the South Platte drainage is very good, and considerable water is still available for storage. Some reservoirs are now filled to capacity. The total reservoir storage in the Arkansas Valley,

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Based on behavior this suggests that *Monachus* probably has a very low rate of maturation with respect to breeding. It is interesting to note that *Lampris* and *Leucosoleas* have a similar breeding rate and *Leucosoleas* is a much larger fish. This may indicate that *Leucosoleas* is more gregarious than *Monachus*. *Monachus* is a pelagic species which breeds in the open ocean, while *Leucosoleas* breeds in coastal waters. *Monachus* is a pelagic species which breeds in the open ocean, while *Leucosoleas* breeds in coastal waters.

TABLE II

Species	Length	Maturation		Reproductive		Growth
		Age at first maturity	Age at second maturity	Age at first maturity	Age at second maturity	
<i>Monachus</i>	30.0	5.35	6.15	5.35	6.15	1.00
<i>Leucosoleas</i>	30.0	5.25	5.75	5.25	5.75	1.00
<i>Monachus</i>	30.0	5.35	6.15	5.35	6.15	1.00
<i>Leucosoleas</i>	30.0	5.25	5.75	5.25	5.75	1.00
<i>Monachus</i>	30.0	5.35	6.15	5.35	6.15	1.00
<i>Leucosoleas</i>	30.0	5.25	5.75	5.25	5.75	1.00
<i>Monachus</i>	30.0	5.35	6.15	5.35	6.15	1.00
<i>Leucosoleas</i>	30.0	5.25	5.75	5.25	5.75	1.00

Based on behavior this suggests that *Monachus* probably has a very low rate of maturation with respect to breeding. It is interesting to note that *Lampris* and *Leucosoleas* have a similar breeding rate and *Leucosoleas* is a much larger fish. This may indicate that *Leucosoleas* is more gregarious than *Monachus*. *Monachus* is a pelagic species which breeds in the open ocean, while *Leucosoleas* breeds in coastal waters.

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to date, is reported to be 155,600 acre-feet, which is a gain of 25,750 acre-feet since November 1, 1938. For the North Platte River drainage the storage in Wyoming is two-thirds more than it was last year at this time.

Soil moisture conditions are exceptionally good in the South Platte, North Platte and Arkansas Valleys in Colorado and Wyoming. In both eastern Montana and Wyoming soil moisture is deficient. The soil in the mountain areas of these drainage basins is well saturated. Soil moisture conditions are good also in the Black Hills in South Dakota.

Over the Missouri and Arkansas drainage areas the present outlook for irrigation water supplies may be summarized as follows: For the North Platte, the supply may be expected to approach that of last year. Because of the water in storage now, there should be an ample supply to meet normal needs this coming summer. In the South Platte drainage, in Colorado, the prospects are good. With much larger amounts of water in storage at this time, as compared with previous years, and higher water content of the snow cover, the outlook for the coming season is even better than it was a year ago. Because of the decided increase in the water content of the snow cover on the Arkansas River watershed over that of last year and the present reservoir storage, there is at this time an exceptionally good prospect for an adequate water supply in this valley for the coming season.

MISSOURI AND ARKANSAS RIVERS

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 Issued Mar. 10, 1939. Colo. Expt. Station, Fort Collins, Colo.

No.	Main Drainage and Snow Course	Local Drainage	Location	Description	Elev.		National Forest		Mar. 1. Snow Course Measurements			
					1938		1939		Avg.			
					In.	In.	In.	In.	In.	In.		
6	JEFFERSON RIVER	Red Rock Cr.	Idaho	6 mi. N. Spencer	6800	Targhee	34.6	40.6	32.0	9.2	11.9	7.3
7	Camp Creek*	Rock Creek	Mont.	13 mi. NE. Sulia	5400	Bitterroot	21.0	26.6	26.2	5.8	6.8	
7	East Fork R.S.*	Rock Creek	"	8 mi. N. Polaris	8450	Beaver Head	26.6	52.2	45.0	11.9	16.8	
9	Elkhorn Hot Spgs.	Wise River	"	Gibbons Pass	7100	Bitterroot	52.2	37.4	45.0	11.9	11.2	
9	Gibbons Pass	N.Fk. Big Hole	Idaho	3 mi. S. Gibbons P.	6200	Salmon	43.4	12.0	12.0	2.8	12.5	
7	Moose Creek*	N.Fk. Big Hole	Mont.	Pipestone Pass	7200	Deer Lodge	39.0	31.6	38.5	10.5	9.2	
26	Pipestone Pass	Pipestone Cr.	"	Average for Drainage							9.9	
2	MADISON RIVER	Firehole River	Wyo.	Lewis Lake	7700	Yel. Nat. P.	74.1	81.0	74.0	24.9	25.9	
2	Aster Creek*	South Fork	Idaho	Big Springs	6500	Targhee	60.3	53.0	60.0	18.1	14.8	
3	Big Springs*	Cabin Creek	Mont.	Hebgen Dam	6550	Gallatin	45.8	"	"		14.4	
8	Hebgen Dam	Firehole R.	Wyoming	22-11S-3E	7900	Yel. Nat. P.	104.0	107.0	111.0	33.5	35.4	
8	Lewis L. Divide*	Gibbon River	"	14-2N110-7W	"	"	"	"	"		8.8	
11	Norris Basin	Greyling Cr.	Mont.	14-5N110-7W	7500	"	32.7	"	"		16.8	
11	Twenty-One Mile*	South Fork	Mont.	1-11S-5E	7150	"	52.5	"	"			
15	West Yellowstone	Yellowstone	Mont.	34-13S-5E	6700	Gallatin	34.0	34.0	31.7	9.6		
15				Average for Drainage	79.5		58.0	81.7	25.5	18.0	25.9	
2	GALLATIN RIVER	Hyalite Cr.	Mont.	20 mi. S. Bozeman	14-5S-6E	Gallatin	49.7				13.6	
2	Devil's Slide	Hood Meadow	"	19 mi. S. Bozeman	22-4S-6E	"	22.9				5.3	
2		Hood Meadow Extn.	"	14 mi. S. Bozeman	22-4S-6E	"	23.0				5.3	
2		Mystic Lake No. 1	"	12 mi. SE. Bozeman	31-3S-7E	"	22.6				5.4	
2		Mystic Lake No. 2	"	12 mi. SE. Bozeman	31-3S-7E	"	22.3				4.9	
2		Twenty-one Mile	"	8 mi. S. Gallatin	1-11S-5E	7150	Yel. Nat. P.	52.5	52.5	30.9	16.8	
2				Average for Drainage	22.5		30.6	29.9	29.9	4.9	8.6	

*Adjacent Drainage

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		State	Locality				Av. Water Content		In.	In.			
							1938	1939					
MISSOURI RIVER													
5 Chessman Res.	Tennile	Mont.	11mi. SW. Helena	2-8N-5W	6200	Helena	14.8	3.9					
35 Tennile Cr. Lower	"	"	17mi. SW. Helena	13-8N-6W	6250	"	15.6	3.3					
36 Tennile Cr. Middle	"	"	"	13-8N-6W	6800	"	24.2	5.7					
37 Tennile Cr. Upper	"	"	"	19-8N-5W	8000	"	27.2	7.6					
30 Temple Pass	Canyon Cr.	"	Temple Pass	16-13N-7W	6900	"	33.7	9.2					
King's Hill	Belt Cr.	"	21mi. NW. Sul. Spgs.	35-13N-7E	7950	Levi & Clk	35.8	10.6					
Orville Harris	Mussellshell R.	"	12mi. E. W. S. Spgs.	31-10N-9E	6500	"	--	17.5					
10 Goat Mountain	South Fork	"	26mi. W. Gilman	47-2N112-9W	7000	"	--	28.2					
Grasshopper	Grasshopper Cr	"	6mi. E. W. S. Spgs.	19-9N-8E	7000	"	--	16.7					
MARIAS RIVER				Average for Drainage			25.6	17.1					
Desert Mountain*	Gutbank Cr.	Mont.	4mi. S. Belton	24-31N-19W	5600	Flathead	37.0	10.7					
18 Marias Pass	Two Medicine	"	Summit	48-3N113-4W	5250	Glacier NF	44.0	15.6					
YELLOWSTONE RIVER				Average for Drainage			40.5	13.1					
Blacktail Deer Cr	Blk. Tail Deer	Wyo.	11mi. SE. Gardiner	7500	Yel. Nat. P.	34.0	34.0	9.0	9.5				
Camp Senia	W. Br. Rock Cr.	Mont.	10mi. W. Red Ldg.	7870	Custer	14.1	14.4	22.2	4.0				
Canyon	Tower Cr.	Wyo.	8mi. N. Canyon Jct.	7750	Yel. Nat. P.	36.7	26.0	29.0	3.0				
Cooke City	Soda Bottles C	Mont.	25-9S-14E	7400	Absaroka	27.7	37.0	6.8	9.9				
Crevice Mtn. #1	Yellowstone	Mont.	26-9S-9E	8400	Yel. Nat. P.	--	--	37.0	7.0				
Crevice Mtn. #2	Yellowstone	Mont.	25-9S-9E	8200	"	--	--	22.8	8.5				
Beaver Dams	Blk. Tail Deer	Wyo.	44-9N110-6W	7200	"	23.9	25.0	5.8	9.1				
Lake Camp	Yellowstone	3mi. NE. Fishing Br.	44-6N110-4W	7850	"	40.6	40.6	10.6	5.0				
Lupine Creek	Lupine Cr.	Wyo.	44-9N110-6W	7300	"	29.3	30.0	28.7	7.5				
Porcupine	Porcupine Cr	Mont.	10-4N-10E	6500	Absaroka	--	--	16.5	7.2				
			Average for Drainage	26.6		29.5	28.4	6.5	3.2				
									6.6				

*Adjacent Drainage

Date of birth		Name		Address		Phone number		Employment		Education		Health		Family		Religious affiliation		Other information	
1940	July 15	John	Smith	123 Main Street	Anytown, USA	(555) 123-4567		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Catholic			
1941	September 10	Mary	Johnson	456 Elm Street	Anytown, USA	(555) 234-5678		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1942	January 20	Robert	Williams	678 Oak Street	Anytown, USA	(555) 345-6789		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1943	March 15	Elizabeth	Miller	890 Pine Street	Anytown, USA	(555) 456-7890		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1944	May 10	James	Anderson	101 Cedar Street	Anytown, USA	(555) 567-8901		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1945	July 20	William	Evans	123 Elm Street	Anytown, USA	(555) 678-9012		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1946	September 15	Patricia	Clark	456 Oak Street	Anytown, USA	(555) 789-9012		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1947	November 10	John	Smith	123 Main Street	Anytown, USA	(555) 123-4567		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Catholic			
1948	January 20	Mary	Johnson	456 Elm Street	Anytown, USA	(555) 234-5678		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1949	March 15	Robert	Williams	678 Oak Street	Anytown, USA	(555) 345-6789		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1950	May 10	Elizabeth	Miller	890 Pine Street	Anytown, USA	(555) 456-7890		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1951	July 20	James	Anderson	101 Cedar Street	Anytown, USA	(555) 567-8901		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1952	September 15	William	Evans	123 Elm Street	Anytown, USA	(555) 678-9012		Waiter	Waitress	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			
1953	November 10	Patricia	Clark	456 Oak Street	Anytown, USA	(555) 789-9012		Waitress	Waiter	High School Graduate		Good	Yes	2 children	Both parents alive	Protestant			

* indicates deceased

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					Av. Depth	Avg.	
SHOSHONE RIVER	Shoshone R.	Brooks Lake	9200	Washakie	49.8	49.3	14.3
19 Brooks Lake No.2*	"	Brooks Lake	23-44N-110W	9200	Washakie	49.8	49.3
BIGHORN RIVER					16.1	14.3	
19 Brooks Lake No.2	Wind River	Brooks Lake	23-44N-110W	9200	Washakie	16.8	17.4
22 Roaring Fork	Roaring Fk.	"	7-31N-101W	10200	Washakie	3.6	2.6
20 Sheridan Cr.R.S.	Sheridan Cr.	"	3-42N-109W	7500	Washakie	19.7	14.7
21 Norton Meadow	Roaring Fk.	"	18-31N-101W	9200	Washakie	3.2	3.1
POWDER RIVER	Middle Fk.	"		Average for Drainage	11.6	6.7	3.5
30 Red Fork	Middle Fk.	"	18-43N-85W	7500	Off Forest	24.5	22.0
NO. PLATTE RIVER					29.0	29.0	6.7
51 Big Creek Lake	Big Creek	Colo.	9-11N-82W	9000	Routt	32.9	—
7 Bottle Creek	Encmpmnt Cr.	Wyo.	24-14N-85W	8200	Medicine Bow	46.3	48.3
8 Columbine Lodge	Grizzly Cr.	Colo.	21-2N-82W	9300	Routt	59.1	68.4
37 North French Cr.	N.French Cr.	Colo.	27-16N-80W	10200	Medicine Bow	76.8	77.7
38 N.Barrett Cr.#2	N.Barrett Cr.	Wyo.	30-16N-80W	9400	"	58.6	60.6
9 Old Battle	Encmpmnt Cr.	"	29-14N-85W	9800	"	84.1	69.5
7 Park View	Illinois Cr.	Colo.	24-5N-78W	9200	Routt	34.9	31.8
39 Ryan Park No. 2	Barrett Cr.	Colo.	34-16N-81W	8400	Medicine Bow	38.9	41.3
8 Weidner Spring	Encmpmnt Cr.	Wyo.	27-14N-85W	9000	"	45.2	58.1
1 Cameron Pass	Michigan Cr.	Colo.	2-6N-76W	10300	Roosevelt	51.7	59.7
SWEETWATER RIVER				Average for Drainage	56.1	51.1	17.5
29 Gramier Meadows	Rock Creek	Wyo.	19-30N-100W	9000	Washakie	36.0	30.9

*On adjacent drainage

#Readings on original course

9.1

7.4

8.7

16.7

17.1

17.2

20.2

10.2

11.4

14.8

16.0

11.3

14.4

12.9

18.0

25.6

20.8

13.2

13.7

18.4

20.4

30.4

19.9

27.5

24.4

9.1

10.2

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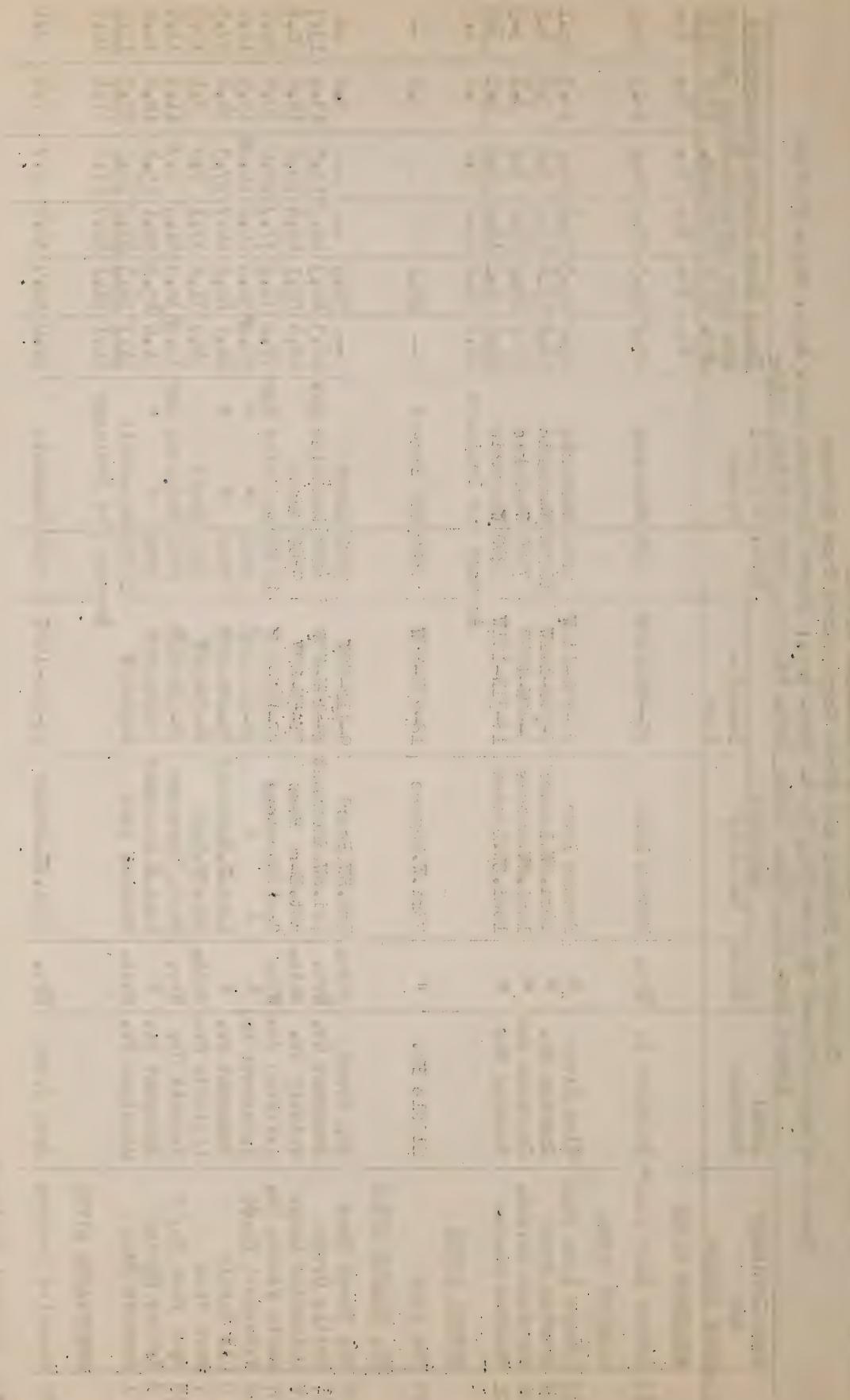
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						Av. Snow Depth		Av. Tater Content		In. In.	In. In.	
						1938	1939	Avg.	1938			
3 Brooklyn Lake	Nash Fork	Wyo.	7 mi. NW. Cntrnial	10200	Medicine Bow	54.2	53.7	51.0	18.3	19.1	17.6	
11 Fox Park	Fox Creek	"	Fox Park	9200	"	28.5	31.0	31.6	7.3	9.1	7.6	
36 Hairpin Turn No. 2	Nash Fork	"	5 mi. NW. Cntrnial	9500	"	30.3	30.0	30.7	8.3	8.6	8.1	
35 Libby Lodge No. 2	Libby Cr.	"	3 mi. NW. Cntrnial	8700	"	28.0	23.5	32.4	7.2	5.7	8.7	
34 Pole Mountain No. 2	Soldier Cr.	"	10 mi. SE. Laramie	8700	"	19.7	22.8	27.7	4.4#	5.5	6.2	
4 W. Port. G.-P. Tunnel	Laramie R.	Colo.	4 mi. N. Chambers L.	8600	Roosevelt	28.6	27.8	32.5	7.3	8.0	8.1	
50 Deadman Hill*	Deadman Cr.	"	10 mi. W. R. Feathner	10200	"	43.3	43.6	46.3	10.8	12.0	10.6	
71 Deadman Hill No. 2*	Deadman Cr.	"	10200	"	Average for Drainage	38.7	36.3	41.1	9.5	9.6	9.4	
						33.7	33.6	36.7	9.1	9.7	9.5	
14 Hoosier Pass	S. Platte	Colo.	13-8S-78W	11400	Pike	35.5	33.9	47.1	8.0	8.0	11.3	
15 Fairplay	S. Platte	"	33-9S-77W	10000	"	37.2	37.1	6.4	0.3	4.0	0.6	
					Average for Drainage	19.3	17.0	26.7	4.1	4.0	5.9	
34 Pole Mountain No. 2	Crow Creek	Wyo.	10 mi. SE. Laramie	35-15N-72W	8700	Medicine Bow	19.0	#22.8	27.7	4.4#	5.5	6.2
3 Big South	Poudre R.	Colo.	2 mi. E. Chambers L.	33-2N-75W	8600	Roosevelt	7.5	5.5	9.4	1.4	1.7	1.0
1 Cameron Pass	Joe Wright Cr.	"	6 mi. W. Chambers L.	2-6N-76W	10300	"	51.7	54.3	59.7	16.6	20.2	17.2
2 Chambers Lake	Poudre R.	"	6-7N-75W	9000	"	19.5	20.0	25.9	4.8	5.9	5.0	
50 Deadman Hill	N. Poudre R.	"	10 mi. W. R. Feathner	26-10N-75W	10200	"	43.3	43.6	46.3	10.8	12.0	10.6
71 Deadman Hill #2	N. Poudre R.	"	8 mi. SW. R. Feathner	6-9N-74W	10200	"	38.7	36.3	41.1	9.5	9.6	9.4
68 Hour Glass Lake	Little S. Poudre	"	2 mi. NW. Pingree P.	18-7N-73W	9500	"	26.5	22.3	30.8	5.6	5.2	6.1
65 Lake Irene*	Big S. Poudre	"	1 mi. SW. Milner P.	8-5N-75W	10600	Ry. Mtn. N. P.	59.1	60.2	58.0	19.5	20.7	18.2
					Average for Drainage	35.2	34.6	38.7	9.7	10.8	9.6	
67 Fall River	Fall River	"	12 mi. W. Estes P.	6-5N-74W	10600	Ry. Mtn. N. P.	57.1	56.5	57.8	17.0	17.2	16.9
65 Lake Irene*	Big Thompson R.	"	1 mi. SW. Milner P.	6-5N-75W	10600	"	59.1	60.2	58.0	19.5	20.7	18.2
					Average for Drainage	58.1	58.3	57.9	18.2	19.0	17.6	

#Readings on original course.

*On adjacent drainage

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							Avg.	In.	Avg.	In.
ST. VRAIN RIVER										
41 Wild Basin	N. St. Vrain	Colo.	5mi. W. Allens F.	24-3N-74W	10000	Ry. Mtn. N. P.	36.1	33.2	43.9	8.6
BOULDER CREEK										
5 E. Port. Moffat T.	S. Boulder Cr.	"	East Portal	2-2S-74W	9400	Roosevelt	12.5	9.6	15.5	3.3
60 University Camp #2	N. Boulder Cr.	"	5mi. SW. Ward	28-1N-73W	10300	"	35.9	48.3	59.4	11.8#
CLEAR CREEK						Average for Drainage	24.2	29.0	37.4	7.5
61 Loveland Pass #2	Clear Creek	"	10mi. W. Georgetown	27-4S-76W	10100	Arapaho	41.8#	41.7	50.5	10.7#
ARKANSAS RIVER										
74 LaVeta Pass #2*	Ouchara Cr.	"	LaVeta Pass	22-28S-70W	9300	San Gerondo Cr.	34.7#	—	45.8	8.0#
42 Marshall Creek*	Poncha Cr.	"	Marshall Pass	21-48N-6E	10800	Cochetopa	44.8	34.0	47.8	12.0
43 Poncha Creek	Poncha Cr.	"	Marshall Pass	19-48N-7E	10500	"	30.9	26.2	35.0	8.8
19 Tennessee Pass	Tennessee Cr.	"	Tennessee Pass	21-68S-80W	10200	"	36.2	32.9	40.4	8.9
21 Twin Lakes Tun.	Lake Cr.	"	Twin Lakes Tun.	22-11S-82W	10500	"	35.8	33.4	38.2	10.0
48 Whiskey Creek	Whiskey Cr.	"	Whiskey Cr. Pass	31-32N-69W	10200	Maxwell Grant	—	—	33.8	—
78 Four Mile Park No. 2	Lake Cr.	"	3mi. SW. Twin Lakes	23-11S-81W	9700	Cochetopa	—	—	15.5	—
79 Fremont Pass	No. 2 E. Fork Ark. R.	"	Fremont Pass	2-8S-79W	11400	Arapaho	54.0#	47.8#	56.8	12.4#
			Average for Drainage				39.4	34.9	38.9	10.2

*On adjacent drainage

#Readings on original course.

(1725-39)

